

Two new species of Spionidae (Polychaeta) from Tahiti, French Polynesia

Pat Hutchings, Patrick Frouin, and Christian Hily

(PH) The Australian Museum, 6 College Street, Sydney NSW 2000 Australia;

(PF) Centre ORSTOM de Brest, B.P. 70, F-29280 Plouzane, France;

(CH) URA CNRS D 1513, Institute d'Etudes Marines, 6 avenue Le Gorgeu,
F-29287 Brest cedex, France

Abstract.—Two new species of Spionidae, *Scoelepis* (*Scoelepis*) *melasma* and *S. (S.) dichia* are described from the intertidal area of exposed Tahitian beaches. The species co-occur and are restricted to basaltic sandy beaches. *Scoelepis (S.) melasma* is characterized by the absence of an occipital tentacle, neuropodial unidentate, hooded hooks beginning on setiger 40–41, notopodial hooded hooks absent and branchiae fused basally. *Scoelepis (S.) dichia* also lacks an occipital tentacle, with neuropodial bidentate, hooded hooks beginning from setiger 26–32 and with posterior neuropodia having almost all hooded hooks, notopodial hooks absent, and branchiae fused basally.

During an ecological investigation of the intertidal fauna of exposed beaches in Tahiti, two extremely abundant species of spionids were collected. The polychaete fauna of French Polynesia or any other region of the South Pacific is poorly known and many of the species that have been described are incompletely known. While attempting to identify these spionids using the key of Blake & Kudenov (1978), it became apparent that they represented two new species, of the genus *Scoelepis* Blainville, 1828 and the subgenus *Scoelepis* sensu stricto as defined by Maciolek (1987).

The following abbreviations have been used in the text, AM, Australian Museum, Sydney; BMNH, The Natural History Museum, London; MNHN, Museum Nationale D'Histoire Naturelle, Paris; LACM, Los Angeles County Museum, Los Angeles; USNM, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Scoelepis (Scoelepis) melasma,
new species

Fig. 1A–G, Table 1

Material examined.—French Polynesia, Tahiti, La Fayette Beach, 17°30.238'S, 149°27.377'W, intertidal, basaltic sand, 27 March 1995. Holotype (AM W23103), Paratypes: 2 (BMNH ZB 1996.518), 2 (MNHN UE413), 1 (USNM 170033), 10 (AM W23104), 1 (LACM Poly 1831, 1 (AM W23107).

Description.—Description based on holotype except where stated. Alcohol preserved material pale yellow, live material dark green in colour. Holotype posteriorly incomplete, 23.0 mm in length, 1.52 mm in width anteriorly, with about 92 segments. Paratype material varying in length from 20 to 30 mm and 1.52 to 3.04 mm in width anteriorly for 63 to 95 setigers, none of the type material is complete and the majority of the type material consists of ripe males and females.

Elongate pointed prostomium (Fig. 1A),

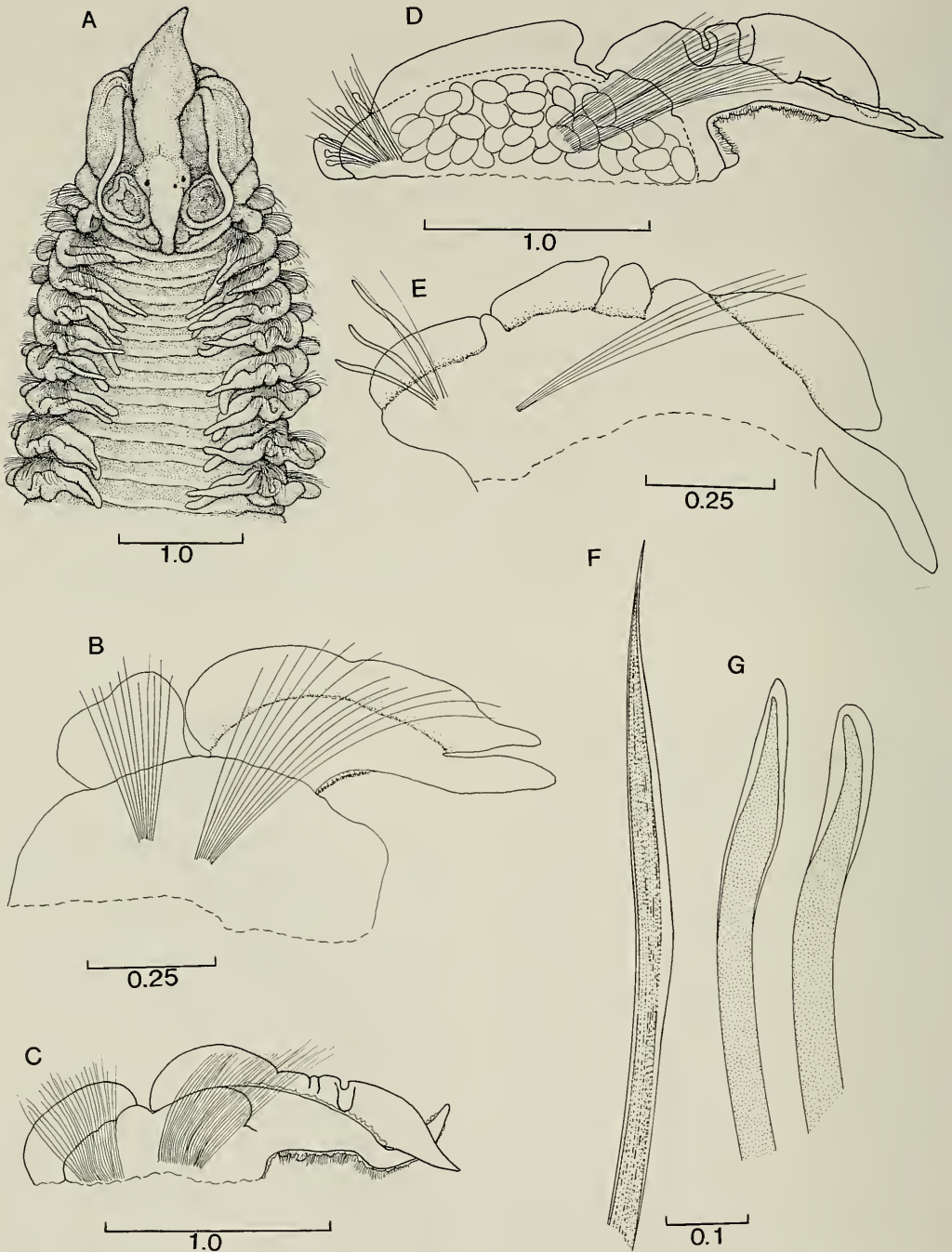


Fig. 1. *Scolelepis (Scolelepis) melasma* new species. Holotype (AM W23103). A. Dorsal view of anterior segments, B. Lateral view of parapodium of setiger 3, C. Lateral view of parapodium of setiger 20, D. Lateral view of parapodium of setiger 50, E. Lateral view of parapodium of setiger 85, F. Notoseta from setiger 3, G. Neurosetae from setiger 85.

Table 1.—Taxonomic characteristics of species in the subgenus *Scolecopsis* (*Scolecopsis*) described since Maciolek (1987).

Species	Oecipital tentacle	Neuropodial hooks begin on setiger	Neuropodial hooks— with nos. of teeth	Notopodial hooks present or absent	Neuropodial notch present	Notosetae present on setiger 1	Branchial fusion	Comments
<i>S. (S.) branchia</i> Imajima, 1992	No	22	1	Absent	No	Yes	Fused basally	Accessory digitiform branchiae present from setiger 7, by setiger 30 present as 7 lobes, then decreasing
<i>S. (S.) brevisbranchia</i> Hartmann-Schröder, 1991	Yes	15	2–3	Absent	Yes	No	Fused basally	Exact nos. of teeth difficult to determine from figures
<i>S. (S.) burkovskii</i> Sikorski, 1994	No	17–19	3	Absent	No	No	Fused basally	From the figures, clearly belongs to this subgenus although Sikorski (1994) did not designate subgenus
<i>S. (S.) crenulata</i> Hartmann-Schröder, 1991	Yes	34	2–3	Absent	No	Yes	Fused basally with notopodial lamellae with crenulated margins	Teeth above main fang very small and difficult to count
<i>S. (S.) denmarkensis</i> Hartmann-Schröder, 1983	No	36	3	Present	Yes	Yes	Fused for most of its length anteriorly, posteriorly only fused basally	Species overlooked by Maciolek (1987)
<i>S. (S.) dicta</i> n. sp.	No	26–32	2	Absent	Yes	No	Fused basally	Posterior neurosetae almost entirely hooded hooks
<i>S. (S.) matsugae</i> Sikorski, 1994	No	11–22	3	Present	Yes	No	Fused basally	Notopodial hooks begin on setigers 13–14. Sikorski (1994) did not designate subgenus
<i>S. (S.) lingulata</i> Imajima, 1992	Yes	21	1	Present	Yes	Yes	Fused basally	Neuropodial interramal lamellae on posterior setigers are lingulate and obliquely protruded
<i>S. (S.) melasma</i> n. sp.	No	40–41	1	Absent	Yes	Yes	Fused basally	Notosetal details not given
<i>S. (S.) planata</i> Imajima, 1992	Yes	19	3–4 pairs above main fang	?	Yes	No	Fused basally	
<i>S. (S.) sagittaria</i> Imajima, 1992	Yes	32	2–3	Present	Yes	Yes	Fused basally	Notopodial hooks from setiger 52
<i>S. (S.) variegata</i> Imajima, 1992	No	27	2	Absent	Yes	No	Completely fused until setiger 29, then only basally	

dorsal surface faintly tessellated, extending posteriorly to form inflated keel with two eye spots on one side and one on other side. Occipital papillae absent. Eye spots located just anterior to point of inflation. Peristomium expanded laterally to form pair of lateral wings enveloping the prostomium. Ventral mouth with raised glandular margins, pharynx not extended on holotype but partially everted on some type material. Palps detached on holotype but bases where previously attached clearly visible. Palps on paratypes extending to between setigers 10–12.

Setiger 1 with both noto- and neuropodia. Notopodia small rounded lobe with small bundle of capillaries, neuropodia, bluntly triangular lobe with capillaries. Setiger 2, with larger bluntly triangular neuropodial lobe and capillary setae, notopodium with small, rounded acicular lobe and laterally elongated postsetal lobe and a digitiform branchia attached basally, and numerous long capillary setae. Neuropodial and notopodial postsetal lobes increasing in size on subsequent setigers, margins of these lobes becoming thinner and crenulate. Similarly, the length of branchiae increasing on subsequent setigers and branchiae present on all remaining setigers of holotype. Anterior branchiae fused basally to notopodial lamellae. Fig. 1B–E illustrate the relative proportions of the parapodial lobes along the body.

All notopodial setae capillaries, with smooth tips and narrow wings (Fig. 1F), setiger 3 with about 20 capillaries and setiger 85 with about five capillaries. Notopodial hooded hooks absent. Neuropodial setae initially capillaries; setiger 3 with about 12 capillaries; from setiger 41, unidentate hooded hooks appear (Fig. 1G), 2–3 per fascicle; setiger 85 with two capillaries and three hooded hooks.

Segments well demarcated dorsally, with raised intersegmental ridges present, venter smooth with mid ventral glandular stripe.

Holotype a gravid female with numerous oocytes restricted to the parapodia and the

area just adjacent to the parapodia, from about setiger 38 onwards (Fig. 1D), oocytes restricted to the lateral walls.

Variation.—In some paratypes a slight bulbous swelling occurs immediately below apex of the prostomium. The setiger on which neuropodial hooded hooks begin varies from 40 to 41. Posterior fragments collected indicate that the pygidium is a rounded cushion. Some ripe females with oocytes developed from setiger 34 and continuing to about setiger 85. Ripe males with spermatozoa also restricted to parapodial lobes from about setiger 35 to 90.

Remarks.—Maciolek (1987) reviewed the genus *Scolelepis* and based upon the structure of the hooded hooks, divided the genus into two subgenera, *Scolelepis* and *Parascolelepis*. The subgenus *Scolelepis* is characterized by falcate hooded hooks with 0–2 small apical teeth and a straight shaft, and the subgenus *Parascolelepis* is characterized by multidentate hooded hooks above a large main fang and curved shaft. Based upon these characters this new species from Tahiti belongs in the subgenus *Scolelepis*.

Maciolek (1987) tabulated the major characteristics of the 37 described species and three other described species having unidentate neuropodial hooded hooks, *S. (S.) knightjonesi* (de Silva, 1961 incorrectly quoted as 1965 by Maciolek 1987) described from Sri Lanka, *S. (S.) lamellicinata* Blake & Kudenov, 1978 from Australia and *S. (S.) lefebvrei* (Gravier, 1905) from Djibouti, Red Sea. However, of these, *S. (S.) knightjonesi* has an occipital papilla present that is lacking in *S. (S.) melasma*. The new species also has shorter palps than *S. (S.) knightjonesi*, which has palps extending to setiger 28 rather than setigers 10–12; in addition, the branchiae occur only laterally (Fig. 1A) and do not meet mid-dorsally, whereas on *S. (S.) knightjonesi* the branchiae overlap mid-dorsally. The new species can be easily distinguished from *S. (S.) lefebvrei* and *S. (S.) lamellicinata* as both these species have both noto- and neuro-

podial hooded hooks, whereas the new species has neuropodial hooks only present.

Since Maciolek's (1987) review several additional species of *Scoelepis* (*Scoelepis*) have been described and these are shown in Table 1, using the same characters as used by Maciolek, together with the two new species described here. Two of these recently described species of *Scoelepis* (*Scoelepis*) have unidentate neuropodial hooded hooks, *S. (S.) branchia* Imajima, 1992 and *S. (S.) lingulata* Imajima, 1992. The first of these species has accessory branchiae, which clearly distinguishes it from *S. (S.) melasma*, and the latter species has neuropodial hooded hooks from setiger 21, whereas the new species has them present from setiger 40–41.

Habitat and ecology.—The species occurs on all basaltic beaches in Tahiti which are found on both the east and west coasts of the island, on exposed beaches that are not protected by a barrier reef. The species lives in non-permanent mucous tubes and occurs in densities of 700–1000 m², in fine sandy sediments in the intertidal region of the beach; the tidal range is about 50 cm. All these beaches are fully exposed to oceanic waters and the worms occur in the surf zone. For more detailed ecological information see Frouin et al. (1998).

Etymology.—The specific name is a Greek word for "black", which refers to the black basaltic sediments in which this species occurs.

Distribution.—French Polynesia, Tahiti.

Scoelepis (Scoelepis) dica, new species
Fig. 2A–G, Tables 1 & 2

Material examined.—French Polynesia, Tahiti, La Fayette Beach, 17°30.238'S, 149°27.377'W, intertidal, basaltic sand, 27 March 1995. Holotype (AM W23105), Paratypes: 1 (BMNH ZB 1996.519), 1 (MNHN UE 414), 1 (USNM 170034), 20 (AM W23106) and 1 (LACM Poly 1830).

Description.—Description based on holotype except where stated. Alcohol preserved

material pale pink with scattered diffuse brown pigmentation on anterior dorsum and venter, most marked on prostomium. Palps detached but present with distinct brown pigmentation along one axis. Live material dark brown with blood vessels clearly visible around parapodia. Holotype complete, 15.2 mm long, 1.52 mm wide anteriorly, with about 70 segments. Paratype material varies from 15 to 20 mm long and 1.14 to 1.7 mm wide anteriorly for 70 to 75 setigers.

Prostomium pointed, simple elongated cone (Fig. 2A), peristomial wings poorly developed. Occipital papillae absent. Pharynx partially extruded, thin walled and faintly pigmented. Two pairs of eye spots arranged on either side of caruncle. Caruncle extending posteriorly, slightly raised forming an elongate occipital papilla on mid-axis of caruncle. On either side of caruncle scars indicating point of attachment of palps. On paratypes some of which have palps still attached, these extend to setiger 27.

Setiger 1 poorly developed, notopodia with small, rounded triangular lobe, notosetae absent, neuropodia with small conical lobe with few capillary setae present, branchiae absent.

Setiger 2 with elongate rounded notopodial lobe, and an elongate branchial lamella basally attached to notopodial lobe. Capillary notosetae numerous, forming a fan over the lobe. Neuropodia with semi-circular lobe and neurosetal capillaries arranged in a fan. Presetal lobes absent, both parapodial lobes postsetal in origin. Parapodial lobes and branchiae increasing in size on subsequent setigers (Fig. 2B), with margins of lobes thinner and margins of branchiae crenulated. Setiger 3 with about 12 notosetae and 10 neurosetae. Lobes and branchiae fully developed by setigers 3–4, branchiae not reaching mid dorsal line. Posteriorly, notopodial lobe becoming bilobed (Fig. 2C) but, by setiger 48 notopodial lobe almost entire again. Subsequently, the size of the parapodial lobes and branchiae declining although branchiae present almost to pygidium.

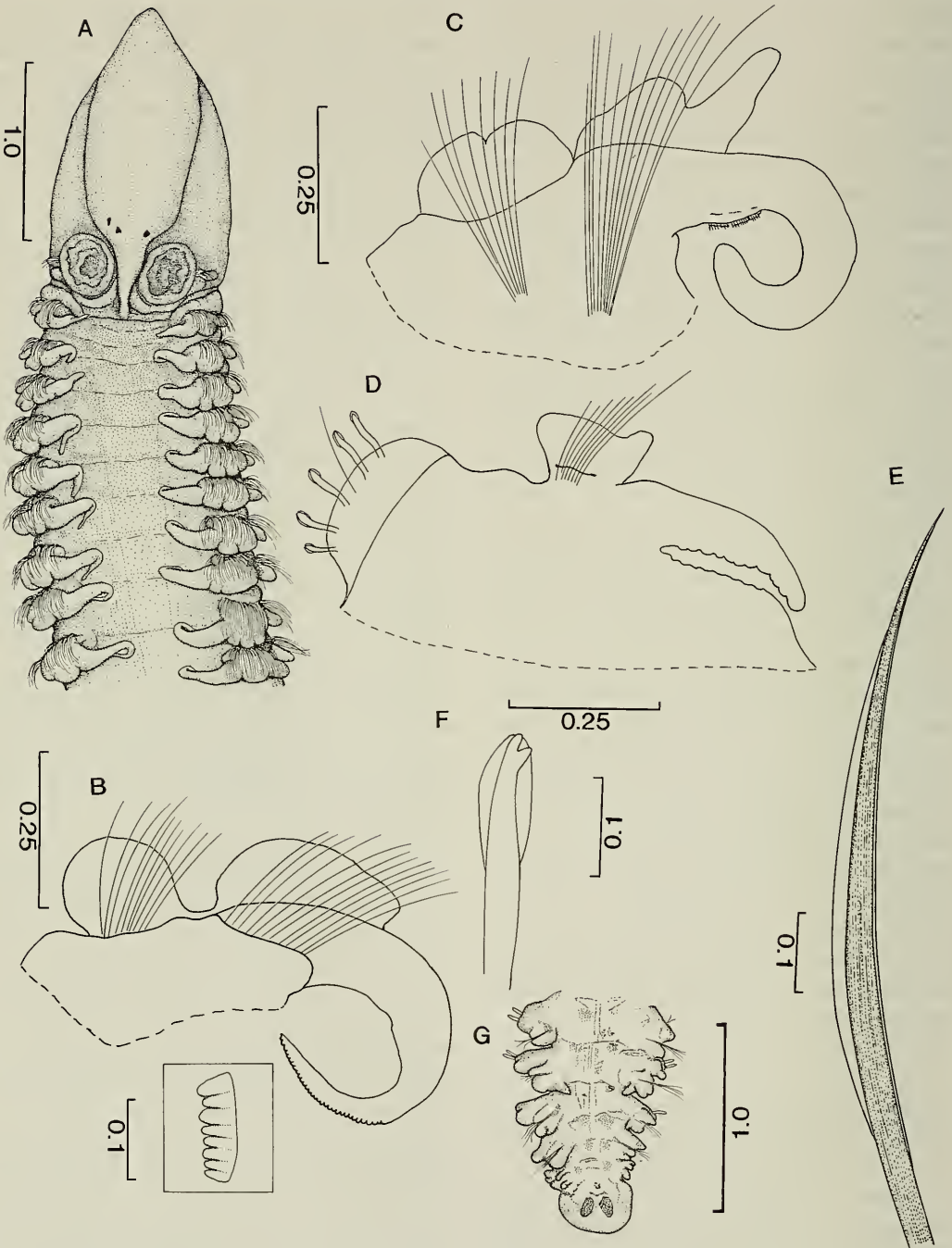


Fig. 2. *Scolelepis (Scolelepis) dica* new species. Holotype (AM W23105). A. Dorsal view of anterior segments, B. Lateral view of parapodium of setiger 3, C. Lateral view of parapodium of setiger 21, D. Lateral view of parapodium of setiger 48, E. Lateral view of parapodium of setiger 85, F. Notoseta from setiger 3, G. Neuroseta from setiger 45, G. Dorsal view of pygidium.

Table 2.—The relationship between body length, maximum anterior width and the setiger on which neuropodial hooded hooks are first present on *S. (S.) dicha*.

Length (mm)	Width (mm)	Setigers present	Start of hooks (set no.)	Comments
8.33	1.31	31*	31	gravid
8.33	1.31	34	29	
11.90	0.60	51*	26	
11.90	1.43	44*	31	
13.10	1.43	42*	31	
14.88	1.19	38*	29	
15.48	1.19	64	29	
17.50	1.31	70	30	
18.45	1.31	70	30	
19.05	1.55	55*	32	gravid
19.64	1.31	69	31	gravid
20.24	1.90	47*	32	
21.43	1.67	71	31	gravid
21.43	1.43	63	30	
22.02	1.55	51*	32	gravid
23.81	1.19	71	31	
25.60	1.31	77*	31	
26.19	1.43	76	31	gravid
27.98	1.67	71	30	
47.62	2.38	71	31	

No. of individuals = 20.

* Indicates incomplete individual.

Notosetae capillaries throughout (Fig. 2E), broad bladed, narrow winged smooth tipped, with granular cores. Notosetal hooded hooks absent. Neurosetae initially capillaries replaced with bidentate hooded hooks (Fig. 2F), which first occur on setiger 31, with a mixture of capillaries and hooks, but rapidly thereafter majority of neurosetae hooded hooks, about 5–6 per parapodium (Fig. 2D).

Large part of dorsum uncovered with well demarcated, central longitudinal, dorsal glandular stripe. Segments are relatively poorly defined, suggesting that internal septa are not well developed. Venter smooth and internal body musculature clearly visible through body wall.

Holotype a gravid female with oocytes clearly visible from setiger 25, about 6–9 oocytes per setiger, but lacking from posterior segments.

Pygidium small rounded cushion with two patches of eye spots (Fig. 2G).

Variation.—The setiger on which neuropodial hooded hooks begin varies from 26 to 32 (Table 2) but on most individuals the hooks begin on setiger 29 or later. There is some evidence that with increasing size as measured by length, that the hooks begin later, suggesting some setal replacement with increasing length and presumably age. As many of the individuals were posteriorly incomplete, the maximum width anteriorly was also measured, but this showed less support for the relationship between increasing size as measured by width and the later development of neuropodial hooded hooks. Based on the 11 complete individuals which were measured, there was not a direct relationship between total length of animal and maximum anterior width. This may be real or perhaps a function of preservation techniques employed as in many polychaete species, the maximum anterior width can be used as a substitute for total length. Additional material would need to be examined to determine which was the valid interpretation.

The intensity of the pigmentation patterns varies within the paratype material. In a ripe male the gametes are clearly visible from setiger 35 and are then present almost until the pygidium.

Remarks.—As discussed above the genus *Scoelepis* has recently been reviewed by Maciolek (1987) and she erected two subgenera. *Scoelepis (S.) dicha* belongs to the subgenus *Scoelepis*. Based on the data presented by Maciolek (1987) and in Table 1, the following species in this subgenus possess bidentate neuropodial hooded hooks, notopodial hooded hooks absent, occipital papillae absent and notosetae absent on setiger 1, thus resembling *S. (S.) dicha*: *S. (S.) cantabra* Rioja, 1918, *S. (S.) vexillatus* Hutchings & Rainer, 1979, *S. (S.) variegata* Imajima, 1992, *S. (S.) williamsi* de Silva, 1961. Pettibone (1963) examined the type of *S. (S.) cantabra* and found that the occipital tentacle was lacking although Rioja had originally described it as being present, but she indicates that the holotype is damaged. However, regardless of this character,

the setiger on which neuropodial hooks start is from setiger 20–25, whereas they start from setiger 26–32 in *S. (S.) dichia*. The new species can be separated from *S. (S.) vexillatus*, as the branchiae are always just fused basally, whereas in the latter species they are completely fused initially, only becoming partially free posteriorly from setiger 29. *Scoloplos (S.) williami* differs from the new species as the neuropodial hooded hooks begin on setiger 40, whereas in the new species they begin from setiger 26–32. Finally, *S. (S.) dichia* can be separated from *S. (S.) variegata* by the degree of fusion of the branchiae, in the new species they are only fused basally, whereas in *S. (S.) variegata* they are completely fused with the notopodial lamellae until setiger 29. Thus *S. (S.) dichia* can be easily distinguished from all these species on the basis of the setigers on which neuropodial hooded hooks begin and the degree of fusion of the branchiae and is therefore described as a new species.

Habitat and ecology.—The species occurs on the basaltic La Fayette beach in Tahiti and appears to be absent from other basaltic beaches that are found on both the east and west coasts of the island. The species lives in non-permanent mucous tubes and occurs in densities of 700–1000 m², in the upper intertidal region of the beach just below a line of rocks in fine sandy sediments; the tidal range is 50 cm. This beach is fully exposed to oceanic waters and is not protected by an offshore barrier reef. The species co-occurs with *Scolecopsis (S.) melasma*. For more detailed ecological information see Frouin et al. (1998).

Etymology.—The specific name is a Greek word for “two” referring to the bidentate hooded hooks present in this species.

Distribution.—French Polynesia, Tahiti, La Fayette Beach.

Acknowledgments

We should like to thank Anna Murray for illustrating the anterior views of both species and Kate Attwood for preparing the plates.

Literature Cited

- Blainville, H. de. 1828. Dictionnaire des Sciences Naturelles 47:368–501.
- Blake, J., & J. Kudenov. 1978. The Spionidae (Polychaeta) from southeastern Australia and adjacent areas with a revision of the genera.—Memoirs of the National Museum of Victoria. 39: 171–280.
- De Silva, P. H. D. 1961. Notes on some polychaetes from Ceylon.—Spoila Zeylanica 29:164–194.
- Frouin, P., C. Hily, & P. Hutchings. (1998). Ecology of spionid polychaetes in the swash zone of exposed beaches in Tahiti (French Polynesia).—Comptes Rendus de l'Academie des Sciences de la vie. Paris 321:47–54.
- Gravier, C. 1905. Sur les annélides polychètes de la Mer Rouge (Cirratulien, Spionidiens, Ariaciens).—Bulletin du Muséum d'Histoire Naturelle Paris 11:42–46.
- Hartmann-Schröder, G. 1983. Die Polychaeten des Eulitorals. Pp. 123–167 in G. Hartmann-Schröder & G. Hartmann, eds., Zur Kenntnis des Eulitorals der australischen Küsten unter besonderer Berücksichtigung der Polychaeten und Ostracoden. Teil 9. Die Polychaeten der antiborealen Südküste (zwischen Albany im Westen und Ceduna im Osten).—Mitteilungen aus dem Hamburgischen zoologischen Museum und Institut. 80.
- . 1991. Beiträge zur Polychaetenfauna der Bahia Quillaipe (Süd-Chile).—Helgoländer Meeresuntersuchungen 45:39–58.
- Hutchings, P. A., & S. F. Rainer. 1979. The polychaete fauna of Careel Bay, Pittwater, New South Wales, Australia.—Journal of Natural History 13:745–779.
- Imajima, M. 1992. Spionidae (Annelida, Polychaeta) from Japan VIII. The genus *Scolecopsis*.—Bulletin of the National Science Museum. Series A (Zoology). 18(1):1–34.
- Maciolek, N. J. 1987. A redescription and records of *Scolecopsis* (Polychaeta: Spionidae) from east coast of North America, with a review of the subgenera. Pp. 16–40 in K. Fauchald, ed., Bulletin of the Biological Society of Washington No. 7.
- Pettibone, M. H. 1963. Revision of some genera of polychaete worms of the family Spionidae, including the descriptions of a new species of *Scolecopsis*.—Proceedings of the Biological Society of Washington 76:89–104.
- Sikorski, A. V. 1994. New arctic species of *Scolecopsis* (Polychaeta, Spionidae). Pp. 123–167 in J.-C. Dauvin, L. Laubier, & D. J. Reish, eds., Actes de la 4^{ème} Conférence internationale des Polychètes.—Mémoires Muséum Nationale d'Histoire Naturelle 162.